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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,421	12/12/2003	Thomas B. Beddard	19441-0065	1420

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EXAMINER

VERDIER, CHRISTOPHER M

ART UNIT PAPER NUMBER

3745

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/707,421

Applicant(s)

BEDDARD ET AL.

Examiner

Christopher Verdier

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 and 20 is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☒ Claim(s) 19 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12-12-03 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12-12-03
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____

Specification

The disclosure is objected to because of the following informalities: Appropriate correction is required.

On page 1, line 1, "Description" is superfluous and should be deleted.

The specification lacks page numbers.

In paragraph 22, line 5, "9FA+e" and "7FA+e" are ambiguous.

Claim Objections

Claims 1-17 and 19 are objected to because of the following informalities: Appropriate correction is required.

In claim 1, line 5, "an" should be changed to -- a --.

In claim 5, lines 2-3 and 4, "(about 4.45 millimeters)" and "(about 3.43 millimeters)" are objectionable because they are duplicative of the inch units of length recited in the claims, and because claim limitations in parentheses are not accorded any patentable weight. If Applicant desires to have units of length in millimeters recited in the claims, then it is respectfully suggested that Applicant may wish to add additional dependent claims reciting units of length in millimeters.

In claim 11, lines 2-3 and 4-5, "(about 4.19 millimeters)" and "(about 3.18 millimeters)" is objectionable fore the same reason.

In claim 14, line 3, "(about 2.92 millimeters)" is objectionable fore the same reason.

In claim 17, lines 2-3, "(about 2.03 millimeters)" is objectionable fore the same reason.

In claim 19, line 2, -- are -- should be inserted after "holes".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5, 11, and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 5, line 1, "said turbulated section" is unclear if this is meant to refer to the turbulated section of the first plurality of cooling holes or the turbulated section of the second plurality of cooling holes. In claim 5, line 3, "said non-turbulated section" is unclear if this is meant to refer to the non-turbulated section of the first plurality of cooling holes or the non-turbulated section of the second plurality of cooling holes. In claim 11, lines 1-2, "said turbulated section" is unclear if this is meant to refer to the turbulated section of the first plurality of cooling holes or the turbulated section of the second plurality of cooling holes. In claim 11, line 3, "said non-turbulated section" is unclear if this is meant to refer to the non-turbulated section of the first plurality of cooling holes or the non-turbulated section of the second plurality of cooling holes. In claim 14, lines 1-2, "said non-turbulated section" is unclear if this is meant to refer to the non-turbulated section of the first plurality of cooling holes or the non-turbulated section of the second plurality of cooling holes, or the non-turbulated section of the third plurality of cooling holes

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 6-8, 12-13, and 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Fleck 6,539,627. Note the airfoil 10 comprising a first plurality of cooling holes 20 positioned within the airfoil, with the first plurality of cooling holes comprising a turbulated section 36/38/40 and a non-turbulated section 30, and a second plurality of cooling holes 20 positioned within the airfoil, with the second plurality of cooling holes comprising a turbulated section 36/38/40 and a non-turbulated section 30. The first plurality of cooling holes comprises five cooling holes. The turbulated section of the first plurality of cooling holes comprises ribs 36, 38, 40 therein. The non-turbulated section of the first plurality of cooling holes comprises a plurality of non-turbulated sections 30. The second plurality of cooling holes comprises two cooling holes. The non-turbulated section of the second plurality of cooling holes comprises a plurality of non-turbulated sections 30. A third plurality of cooling holes 20 is positioned in the airfoil and comprises a non-turbulated section 30. The first, second, and third plurality of cooling holes comprises nine cooling holes. A tenth cooling hole 20 is positioned in the airfoil.

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The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Claims 1-2, 6-8, 12-13, and 15-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Fleck 2002/0094272. Note the airfoil 10 comprising a first plurality of cooling holes 20 positioned within the airfoil, with the first plurality of cooling holes comprising a turbulated section 36/38/40 and a non-turbulated section 30, and a second plurality of cooling holes 20 positioned within the airfoil, with the second plurality of cooling holes comprising a turbulated section 36/38/40 and a non-turbulated section 30. The first plurality of cooling holes comprises five cooling holes. The turbulated section of the first plurality of cooling holes comprises ribs 36, 38, 40 therein. The non-turbulated section of the first plurality of cooling holes comprises a plurality of non-turbulated sections 30. The second plurality of cooling holes comprises two cooling holes. The non-turbulated section of the second plurality of cooling holes comprises a plurality of non-turbulated sections 30. A third plurality of cooling holes 20 is positioned in the airfoil and comprises a non-turbulated section 30. The first, second, and third plurality of cooling holes comprises nine cooling holes. A tenth cooling hole 20 is positioned in the airfoil.

Claims 1-2, 4-8, and 10-15 (as far as claims 5, 11, and 14 are definite) are rejected under 35 U.S.C. 102(b) as being anticipated by Chiu 5,413,463. Note the airfoil 22 comprising a first plurality of cooling holes 26 positioned within the airfoil, with the first plurality of cooling holes comprising a turbulated section 42, 44 and a non-turbulated section 38, 40, and a second plurality of cooling holes 26 positioned within the airfoil, with the second plurality of cooling holes comprising a turbulated section 42, 44 and a non-turbulated section 38, 40. The first plurality of cooling holes comprises five cooling holes. The turbulated section of the first plural cooling holes has a first diameter, and the non-turbulated section of the first plural cooling holes has a second diameter, with the first diameter being larger than the second diameter. With regard to claim 5, the recitation that the turbulated section "may have" a diameter of about 0.175 inches is not a positive recitation and has not been accorded weight. The non-turbulated section has a diameter of 0.136 inches. The turbulated section of the first plurality of cooling holes comprises ribs 42, 44 therein. The non-turbulated section of the first plurality of cooling holes comprises a plurality of non-turbulated sections 38, 40. The second plurality of cooling holes comprises two cooling holes. The turbulated section of the second plural cooling holes has a first diameter, and the non-turbulated section of the second plural cooling holes has a second diameter, with the first diameter being larger than the second diameter. With regard to claim 11, the recitation that the turbulated section "may have" a diameter of about 0.165 inches is not a positive recitation and has not been accorded weight. The non-turbulated section has a diameter of 0.125 inches. The non-turbulated section of the second plurality of cooling holes comprises a plurality of non-turbulated sections 38, 40. A third plurality of cooling holes 26 is positioned in the airfoil and comprises a non-turbulated section 38, 40. The non-turbulated section comprises a diameter of

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0.115 inches. The first, second, and third plurality of cooling holes comprises nine cooling holes. See Table I.

Claims 1-2, 6-8, 12-13, and 15-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Barry 5,980,209 (figures 1-4 and 8). Note the airfoil 10 comprising a first plurality of cooling holes 24 positioned within the airfoil, with the first plurality of cooling holes comprising a turbulated section 40 and an unnumbered non-turbulated section, and a second plurality of cooling holes 24 positioned within the airfoil, with the second plurality of cooling holes comprising a turbulated section 40 and an unnumbered non-turbulated section. The first plurality of cooling holes comprises five cooling holes. The turbulated section of the first plurality of cooling holes comprises ribs near 40 therein. The non-turbulated section of the first plurality of cooling holes comprises a plurality of non-turbulated sections. The second plurality of cooling holes comprises two cooling holes. The non-turbulated section of the second plurality of cooling holes comprises a plurality of non-turbulated sections. A third plurality of cooling holes 24 is positioned in the airfoil and comprises a non-turbulated section. The first, second, and third plurality of cooling holes comprises nine cooling holes. A tenth cooling hole 24 is positioned in the airfoil. See column 4, lines 24-37.

Claims 1-2, 6-8, 12-13, and 15-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent 3-182,602 (figures 15-16). Note the airfoil 1 comprising a first plurality of cooling holes 8 positioned within the airfoil, with the first plurality of cooling holes comprising a turbulated section 101, 100, 103 and a non-turbulated section 102, and a second

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plurality of cooling holes 8 positioned within the airfoil, with the second plurality of cooling holes comprising a turbulated section 101, 100, 103 and a non-turbulated section 102. The first plurality of cooling holes comprises five cooling holes. The turbulated section of the first plurality of cooling holes comprises ribs therein. The non-turbulated section of the first plurality of cooling holes comprises a plurality of non-turbulated sections 102. The second plurality of cooling holes comprises two cooling holes. The non-turbulated section of the second plurality of cooling holes comprises a plurality of non-turbulated sections 102. A third plurality of cooling holes 8 is positioned in the airfoil and comprises a non-turbulated section 102. The first, second, and third plurality of cooling holes comprises nine cooling holes. A tenth cooling hole 8 is positioned in the airfoil.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

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the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiu 5,413,463. Chiu discloses an airfoil substantially as claimed as set forth above, including the first plurality and second plurality of cooling holes 26 having a first end and a second end, with the turbulated section extending from points S to S in figure 2, which is scaled to be from about 44 percent of the length of the first and second plurality of cooling holes from the first end to about 77 percent of the length of the first and second plurality of cooling holes from the first end. However, Chiu does not disclose that the first plurality of cooling holes have the turbulated section extending from about 35 percent of the length of the first plurality of cooling holes from the first end to about 75 percent of the length of the first plurality of cooling holes from the first end (claim 3), and does not disclose that the second plurality of cooling holes have the turbulated section extending from about 50 percent of the length of the second plurality of cooling holes from the first end to about 75 percent of the length of the second plurality of cooling holes from the first end (claim 9).

The recitation of the specific range of the length of extension of the turbulated sections is deemed to be a matter of choice in design. Chiu (column 2, lines 17-43) teaches that the length that the turbulated section S-S extends and the geometry thereof is selected in accordance with local cooling requirements along the blade length necessary to maintain the metal wall

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temperatures within design limits. Therefore, Chiu recognizes that the length along the airfoil that the turbulated sections extend is a result effective variable. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to select/optimize the specific range of the length of extension of the turbulated sections in the airfoil of Chiu, in a range such that the first plurality of cooling holes have the turbulated section extending from about 35 percent of the length of the first plurality of cooling holes from the first end to about 75 percent of the length of the first plurality of cooling holes from the first end (claim 3), and such that the second plurality of cooling holes have the turbulated section extending from about 50 percent of the length of the second plurality of cooling holes from the first end to about 75 percent of the length of the second plurality of cooling holes from the first end, for the purpose of providing adequate airfoil wall cooling, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over either (Fleck 2002/0094272 or Barry 5,980,209 or Japanese Patent 3-182,602) in view of North 5,117,626. Fleck '272, Barry, and Japanese Patent 3-182,602 discloses airfoils with tenth cooling holes substantially as claimed as set forth above, but do not disclose that the tenth cooling hole has a diameter of about 0.08 inches.

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North (figure 3 and column 6, lines 24-33) shows a cooled airfoil with cooling holes 8, 9, 10 having a diameter of 0.05-0.08 inches, for the purpose of ensuring high velocity cooling air flow through the holes.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the tenth cooling hole of the airfoil of either Fleck 2002/0094272 or Barry 5,980,209 or Japanese Patent 3-182,602, such that the tenth cooling hole has a diameter of about 0.08 inches, as taught by North, for the purpose of ensuring high velocity cooling air flow through the holes.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Johnson is cited to show an airfoil with turbulated cooling holes.

Thatcher and European Patent 0207799 are cited to show airfoils with cooling holes having turbulated and on-turbulated sections.

Allowable Subject Matter

Claims 18 and 20 are allowed.

Claim 19 contains allowable subject matter; Applicant should correct the informality therein.

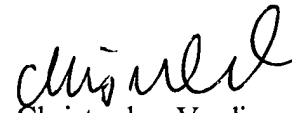
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (703)-308-2638. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (703) 308-1044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
November 10, 2004


Christopher Verdier
Primary Examiner
Art Unit 3745